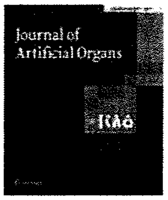
Journal Article



Decellularized ureter for tissue-engineered small-caliber vascular graft

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Abstract Previous attempts to create small-caliber vascular prostheses have been limited. The aim of this study was to generate tissue-engineered small-diameter vascular grafts using decellularized ureters (DUs). Canine ureters were decellularized using one of four different chemical agents [Triton-X 100 (Tx), deoxycholate (DCA), trypsin, or sodium dodecyl sulfate (SDS)] and the histology, residual DNA contents, and immunogenicity of the resulting DUs were compared. The mechanical properties of the DUs were evaluated in terms of water permeability, burst strength, tensile strength, and compliance. Cultured canine endothelial cells (ECs) and myofibroblasts were seeded onto DUs and evaluated histologically. Canine carotid arteries were replaced with the EC-seeded DUs (n = 4). As controls, nonseeded DUs (n = 5) and PTFE prostheses (n = 4) were also used to replace carotid arteries. The degree of decelularization and the maintenance of the matrix were best in the Tx-treated DUs. Tx-treated and DCA-treated DUs had lower remnant DNA contents and immunogenicity than the others. The burst strength of the DUs was more than 500 mmHg and the maximum tensile strength of the DUs was not different to that of native ureters. DU compliance was similar to that of native carotid artery. The cell seeding test resulted in monolayered ECs and multilayered α-smooth muscle actin-positive cells on the DUs. The animal implantation model showed that the EC-seeded DUs were patent for at least 6 months after the operation, whereas the nonseeded DUs and PTFE grafts become occluded within a week. These results suggest that tissue-engineered DUs may be a potential alternative conduit for bypass surgery.

Key words Tissue engineering - Prosthesis - Small-diameter vascular graft

Referenced by

2 newer articles

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EXHIBIT A

Fulltext Preview (Small, Large)